

**II. AMENDMENT TO THE CLAIMS**

**COMPLETE LIST OF CLAIMS THAT ARE OR HAVE BEEN BEFORE THE OFFICE  
AFTER ENTRANCE OF THE AMENDMENTS MADE HEREIN**

The following claims constitute a complete list of claims that are or have been before the office after entrance of the amendments made herein. Amendments to the claims are indicated in accord with Revised 37 C.F.R. §1.121. In accord with such regulation, the listing of claims set forth below replaces all prior versions, and listings, of claims in the application:

**--CLAIMS AS PENDING IN THE APPLICATION WITH AMENDMENTS MADE  
HEREIN START ON NEXT PAGE--**

1.-12. (Canceled)

13. **(CURRENTLY AMENDED)** The method of claim 47 ~~[[44]]~~, wherein the step (vi) ~~of producing a rare cell image mask signal~~ further comprises: analyzing a histogram of luminance values of the color image signal representing the rare cell image; selecting for further processing, rare cell signal points having a luminance value above a last valley preceding a last peak of the histogram; and applying to the selected signal points a closing filter, excluding areas not fitting a predetermined size criterion, and applying a hole filling function.

14. **(CURRENTLY AMENDED)** The method of claim 13, wherein the step (vi) ~~of enhancing a selected rare cell signal~~ further comprises: selecting for further processing, signal points having a saturation value above a first valley following a first peak of the histogram; applying to the selected signal points a closing filter, applying a hole filling function, applying an erosion filter, excluding areas comprising a border of the image, and applying a thick filter, thus enhancing the selected rare cell signal.

15. **(CURRENTLY AMENDED)** The method of claim 14, wherein the step (vi) ~~of enhancing a rare cell signal~~ further comprises: selecting for the rare cell signal, signal points coinciding with the selected rare cell signal, among a cluster of signal points lying within a predetermined size range, the cluster of signal points also having a hue value lying within a predetermined hue value range.

16. **(PREVIOUSLY PRESENTED)** The method of claim 15, further comprising: processing substantially only rare cell areas to generate a biologically identifying signal.

17. **(CURRENTLY AMENDED)** The method of claim 16, further comprising: acquiring an image of the body fluid or tissue cell monolayer smear; detecting in the acquired image the biologically identifying signal; and recording presence of the biologically identifying signal when coincident with a rare cell area from the rare cell biological criteria.

18. **(CURRENTLY AMENDED)** The method of claim 16, further comprising: acquiring an image of a rare cell area of a body fluid or tissue smear, the rare cell area defined by the rare cell data [[set]]; and recording presence of the biologically identifying signal in the rare cell area.

19. – 39. **(CANCELLED)**

40. **(CURRENTLY AMENDED)** The method of claim 47 [[44]], wherein the digitized color image signal is derived through a computer-aligned plurality of microscope objectives from a large field sample.

41. **(CURRENTLY AMENDED)** The method of claim 47 [[44]], wherein the rare cell is present at a concentration of 0.001%, 0.0001%, 0.00001%, or 0.000001%.

42. – 44. **(CANCELLED)**

**45. (CURRENTLY AMENDED)** A computer software product for use in a computerized microscopic vision system comprising a computer-readable storage medium containing a sequence of computer-directed steps to identify automatically a rare cell image, in accordance with claim [[44]] 47.

**46. (CANCELLED)**

**47. (NEW)** A computer-controlled method for automated rare cell image identification, comprising the programmed steps of:

- (i) preparing a cell sample from a body fluid or tissue;
- (ii) depositing, fixing and optionally staining said cell sample in a monolayer on a substrate, comprising rare cells or blobs containing rare cells;
- (iii) scanning and digitizing a native or stained color image of a rare cell candidate or a blob containing a rare cell candidate in said monolayer and starting from an origin  $(x_1, y_1)$ , continuously digitally recording and computer storing x and y coordinates as well as focal y-z coordinates thereof;
- (iv) digitally receiving a red, green and blue (RGB) color image signal characteristic of said rare cell candidate;
- (v) transforming the digital color image signal to a binary quantized processing color space represented by Hue, Luminescence and Saturation (HLS);
- (vi) enhancing detection of said rare cell color image signal by applying a computer implemented HLS signal mask with limiting pixel values;

(vii) identifying said rare cell candidate by measuring pre-set criteria of the digitized image of a cell or cell nucleus, in terms of size, morphology, and characteristic cell markers; and

(viii) automatically locating a computer-controlled label dispensing system over said rare cell which system is programmed to tag selectively said rare cell *in situ* to determine biological criteria comprising genomic variation, mutation, or chromosomal abnormality.